

# Multi-country comparison of insect herbivore communities and leaf herbivory, on mangroves

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## Abstract

The role of herbivorous insects in mangrove ecosystems is underrated and relatively unexplored. This paper compares and contrasts mangrove insect herbivore communities and leaf herbivory levels, across four countries (Australia, Florida, Belize and Panama) as well as examining these patterns along nutrient and latitudinal gradients.

Studies on mangrove herbivores to date have mostly recorded <100 insect herbivore species feeding on them. The actual number feeding on any species is likely to be many hundreds and for mangroves in general, many thousands of species. Mangrove insect faunas are mostly distinctive to this habitat and often specialized on particular species, with <10% of species in common with adjoining terrestrial forests and even <10% of species in common between *Avicennia* and *Rhizophora* species. There are also some emerging patterns across different regions. For example, galls are a conspicuous feature of *Avicennia* species all over the world. In contrast, they are very rare on members of the Rhizophoraceae and other mangroves, though these species support many leaf-miners. Notably, the number of folivorous beetle species collected is low in many locations.

Damage to leaves of *Avicennia* species is generally higher than for Rhizophoraceae species. However for Rhizophoraceae species, damage to apical tips before leaves unfurl from behind the stipules is the dominant cause of leaf loss to herbivores. This reflects very different strategies for dealing with herbivore damage between the species. Damage to Rhizophoraceae apical tips also restricts leaf production and shoot extension but promotes lateral shoots, thus altering both leaf production and tree/canopy architecture. At some sites, wood-borers caused significant leaf loss and conversely at others, leaf-feeders caused significant levels of shoot death.

Herbivory studies should advance to looking at impacts on leaf production rates and upon impacts on the rates of tree growth and their pattern of branching.

## Keywords

insect herbivory, Australia, Florida, Belize, Panama